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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,434	02/27/2004	Xiang Liu	LIU-27-5-18	9785

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BROSEMER, KOLEFAS & ASSOCIATES, LLC (ALU)
1 BETHANY ROAD
BUILDING 4 - SUITE # 58
HAZLET, NJ 07730

EXAMINER	
TRAN, DZUNG D	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,434	LIU ET AL.	
	Examiner	Art Unit	
	Dzung D. Tran	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 March 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-17 and 19-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *21-25* is/are allowed.

6)☒ Claim(s) *1-8,10-17 and 19-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

Claim Objections

1. Claims 1-8 and 10-15 are objected to because of the following informalities:

Please delete "1" in the last line of each claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 17, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 17, 19 and 20, the terminology "operate in deep saturation" is vague and indefinite. How deep saturation is the applicant considering as deep saturation? It is unclear where the deep saturation region of the amplifier is? Every claimed limitation must be positively identified.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-8, 10-15, 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yiannopoulos et al. IEEE Photonics Technology Letters , Vol. 15, No.6, June 2003 in view of Cho et al. . IEEE Photonics Technology Letters, Vol. 15, No.1, January 2003 and further in view of Gnauck US 2002/0021861.

Regarding claims 1, 17 and 20, as far as Examiner understood, Yiannopoulos discloses in Figure 1, a method/apparatus comprising:

a laser and pulse generator (i.e., LD) for generating an optical signal; and

propagating the optical signal through a semiconductor optical amplifier SOA in deep saturation to regulate the amplified optical power (page 861, left column, last paragraph).

Yiannopoulos discloses the signal is a Return Zero signal, he does not specifically disclose the RZ is a phase shift key signal and wherein the amplified optical power is regulated to a saturation output power such that ΔPout (dB)/ ΔAPin(dB) of the optical amplifier is less than about 0.25, wherein Pout is the power of the optical signal output from the amplifier, and Pin is the power of the optical signal input into the amplifier.

Cho, from the same field of endeavor, discloses a RZ-DPSK optical signal that propagating through a semiconductor optical amplifier SOA (see Figure 1, page 162).

At the time of the invention was made, it would have been obvious to an artisan to include the RZ-DPSK of Cho in the system of Yiannopoulos. One of ordinary skill in the art would have been motivated to do that in order to reduce SOA cross talk penalty (page 162 of Cho).

Gnauck discloses in Figures 1 and 4, a SOA is regulated to a saturation output power such that ΔPout (dB)/ ΔAPin(dB) of the optical amplifier is less than about 0.25 (i.e., Figure 4 shown saturation region of SOA includes the region that ΔPout (dB)/ ΔAPin(dB) is less than 0.25 at the end of the operating region A1 and Figure 1, paragraph 0052 discloses the amplifier is operating in a saturation regime such as saturation regime A). At the time of the invention was made, it would have been obvious to an artisan to include the teaching of Gnauck in the system of Yiannopoulos and Cho that is operate the SOA at the region such that ΔPout (dB)/ ΔAPin(dB) of the optical amplifier is less than about 0.25. One of ordinary skill in the art would have been motivated to do that in order to enhance the signal transmission at the higher rate.

Regarding claim 2, Yiannopoulos discloses wherein the amplified optical power is regulated to about the saturation output power of the SOA (page 861, left column).

Regarding claim 3, Yiannopoulos discloses wherein the gain recovery time of the optical amplifier is larger than the bit period of the optical signal (page 862).

Regarding claim 4, Yiannopoulos discloses wherein the optical signal has a data-independent intensity profile (page 861, the optical signal operate at 1550 nm).

Regarding claim 5, Cho discloses wherein the optical signal is an RZ-DPSK signal (page 162).

Regarding claim 10, Gnauck discloses the input power to the SOA can be control (see Figure 4), therefore, the ratio of ΔPout (dB)/ΔPin (dB) of the optical amplifier can be controlled to have the result of less than about 0.25 (i.e., at the end of the operating region A1 of Figure 4).

Regarding claim 11, Yiannopoulos discloses wherein the gain recovery time of the optical amplifier is larger than the bit period of the optical signal (page 862).

Regarding claim 12, Cho discloses wherein the optical signal is an RZ-DPSK signal (page 162).

Regarding claim 19, as far as Examiner understood, Yiannopoulos discloses in Figure 1, an optical signal processor apparatus comprising:

a semiconductor optical amplifier (i.e., SOA)

wherein the system is adapted to transmit the optical signal such that the optical amplifier SOA in deep saturation to regulate the amplified optical power (page 861, left column, last paragraph).

Yiannopoulos differs from claim 19 of the present invention in that he does not specifically disclose a plurality of semiconductor optical amplifiers and wherein the amplified optical power is regulated to a saturation output power such that ΔPout (dB)/ ΔAPin(dB) of the optical amplifier is less than about 0.25, wherein Pout is the power of the optical signal output from the amplifier, and Pin is the power of the optical signal input into the amplifier.

However, whether the apparatus comprises one SOA for equalizing one channel or a plurality SOAs for equalizing a plurality channels is merely an engineering design choices. Examiner also take an official notice that the optical comprises a plurality of semiconductor optical amplifiers is well known in the art.

Gnauck discloses in Figures 1 and 4, a SOA is regulated to a saturation output power such that ΔPout (dB)/ ΔAPin(dB) of the optical amplifier is less than about 0.25 (i.e., Figure 4 shown saturation region of SOA includes the region that ΔPout (dB)/ ΔAPin(dB) is less than 0.25 at the end of the operating region A1 and Figure 1, paragraph 0052 discloses the amplifier is operating in a saturation regime such as saturation regime A). At the time of the invention was made, it would have been obvious to an artisan to include the teaching of Gnauck in the system of Yiannopoulos and Cho that is operate the SOA at the region such that ΔPout (dB)/ ΔAPin(dB) of the optical amplifier is less than about 0.25. One of ordinary skill in the art would have been motivated to do that in order to enhance the signal transmission at the higher rate.

Regarding claims 6-8 and 13-15, Cho discloses wherein the optical signal is a RZ-DPSK signal (page 162). Furthermore, whether the DPSK signal is a pi/2-DPSK signal or constant-intensity DPSK signal is merely an engineering design choices (for example Wei et al. discloses on IEEE Photonics Technology Letters , Vol. 15, No. 11, November 2003, page 1639, pi/2-DPSK signal can use the same receiver that DPSK uses).

6. Claims 21-25 are allowed.

Response to Arguments

7. Applicant's arguments filed on 03/25/2011 have been fully considered but they are not persuasive.

A) Claims 1-8, 10-15, 17, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yiannopoulos et al. in view of Cho et al. and further in view of Gnauck US 2002/0021861.

Applicant argues that Gnauck and Cho references fail to teach or suggest SOA operation in a deep saturation.

Examiner respectfully disagreed, Figure 4 of Gnauck shown the operating region A1 wherein the at the end of region A1 after a linear section where the slope is approach to zero or the ΔPout (dB)/ ΔAPin(dB) is less than 0.25. Furthermore, paragraph 0052 discloses the amplifier is operating in a saturation regime such as saturation regime A of Figure 1 and Cho discloses the missing limitations from the main reference that is RZ-DPSK optical signal. Furthermore, How deep saturation is the applicant considering as deep saturation? It is unclear where the deep saturation region of the amplifier is? Every claimed limitation must be positively identified.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung D Tran whose telephone number is (571) 272-3025. The examiner can normally be reached on 9:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vanderpuye Kenneth, can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dzung Tran
04/23/2011

/Dzung D Tran/
Primary Examiner, Art Unit 2613